Final NPDES General Permit for Discharges from New and Existing Sources in the Offshore Subcategory of the Oil and Gas Extraction Point Source Category for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico (GMG290000)

Agency: United States Environmental Protection Agency

Action: Final Issuance of an NPDES General Permit (April 19, 1999)

Summary: Region 6 of the United States Environmental Protection Agency (EPA) today issues a National Pollutant Discharge Elimination System (NPDES) general permit for discharges in the Oil and Gas Extraction Point Source Category which are located in the Western Portion of the Outer Continental Shelf (OCS) of the Gulf of Mexico. The permit authorizes discharges from new and existing sources and new discharges in the Offshore Subcategory of the Oil and Gas Extraction Point Source Category (40 CFR Part 435, Subpart A) located in and discharging pollutants to Federal waters in lease blocks located seaward of the territorial seas off Louisiana and Texas. The permit was recently reissued for all discharges except produced water (see 63 FR 58722, November 2, 1998). The permit issued today authorizes the discharge of produced water along with the other discharges which were authorized in the November 2, 1998 permit issuance.

Dates: All limits, prohibitions, and monitoring requirements shall become effective thirty days after the publication date of this permit in the Federal Register.

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Supplementary Information: Pursuant to section 402 of the Clean Water Act (CWA), 33 U.S.C. section 1342, EPA proposed and solicited comments on NPDES general permit GMG290000 at 63 FR 2238 (January 14, 1998). Notice of this proposed permit was also published in the New Orleans Times Picayune on January 24, 1998. The comment period closed on March 16, 1998.

The permit issued today authorizes the discharge of produced water. During the comment period for the proposed permit, complex technical issues were raised regarding the proposed limits for produced water. Since operators of new leases would not be authorized to discharge drilling fluids and drill cuttings and thus would be limited in their ability to conduct exploration and development of those leases, the Region recognized the need to quickly reissue the permit. EPA determined that it would require a fair amount of time to develop adequate responses to comments regarding produced water discharges. It was, therefore, determined that the permit should be issued authorizing all other discharges, and the produced water portion would be issued after adequate responses could be developed for the relevant comments. On November 2, 1998 the permit was issued for all discharges except produced water.

In response to public comments, EPA has since conducted a thorough investigation of all issues raised with regard to discharges of produced water. As a result it was determined that the model used to calculated the proposed permit's produced water critical dilutions is the best model currently available; however, several changes in input parameters are in order. Those changes include a higher value for wind speed and a two layer density profile instead of the linear density profile which was used for the proposed permit. The final permit's produced water critical dilutions were calculated in that manner. Additionally, it was decided that the critical dilutions for discharges of seawater and freshwater to which treatment chemicals are added should be recalculated using a higher wind speed. The final permit contains all of those changes.

Region 6 received comments from the Offshore Operators Committee, American Petroleum Institute, Willie R. Taylor - United States Department of Interior, Shell Offshore, Inc., BP Exploration, Inc., and Exxon Company, U.S.A. EPA has considered all comments received. In response to the comments, minor wording changes were made in the final permit in order to clarify certain requirements or to correct typographical errors.

Below are the comments received on the permit requirements for the discharge of produced water along with EPA's response.

Response to Comments.

Comment No. 1:
OOC commented that the permit's critical dilutions should be recalculated using CORMIX version 1.4.

Response:
Although using CORMIX version 1.4, as requested by OOC, would provide less stringent produced water critical dilutions in some cases, there are no valid technical grounds for using that outdated model. CORMIX version 3.20, which is the most current version of the CORMIX model, was used to calculate the proposed permit's critical dilutions for discharges of produced water and seawater and freshwater to which treatment chemicals have been added. CORMIX version 1.4 was not an EPA or Cornell University released version of the model and is no longer available. That version of the model also did not contain the CORMIX3 modules, which were used to calculate the critical dilutions for freshwater and seawater discharges. CORMIX version 3.20 is, however, a widely used model which has been released by EPA and for which the Agency provides technical support through its Office of Science and Technology (Kinerson, Sept. 30, 1998). Also, CORMIX version 3.20 was developed and validated with a great deal of field and laboratory data which are described in available documentation (Doneker and Jirka, 1990, Akar and Jirka, 1991, Jones et.al., 1996, and Jirka et.al., 1996) and have been presented in peer reviewed literature (Doneker and Jirka, 1991, Jirka and Doneker, 1991, Jirka and Akar, 1991, Akar and Jirka, 1994, Akar and Jirka, 1995, and Mendez-Diaz and Jirka, 1996).

Further, the permit allows dischargers to assess the dilution afforded by diffusers. This is accomplished by CORMIX modeling, and such assessments must be consistent with the model used to derive the limits stated in the general permit.

Through discussions with EPA's technical contractor for the CORMIX model, it was determined that several changes in input parameters would result in more representative critical dilutions calculated by CORMIX. A wind speed of 0 meters per second was used for model runs conducted for the proposed permit. Wind induced turbulence will have an effect on produced water dilution and a wind speed of 7.1 meters per second would be more appropriate. Due to the inverted method needed to run CORMIX for a negatively buoyant plume, density stratification would be best modeled as a two layer stable density profile (Doneker Oct. 6, 1998). In an inverted scenario, CORMIX does not calculate the plume to rise as far as it is expected to descend in the real world when the receiving water is modeled as having a linearly stratified density profile. By modeling the receiving water as a two layer stable density profile, the distance the plume rises can be adjusted so that the results more closely simulate the actual discharge (Wilson Dec. 21, 1998). Both of these changes were incorporated in modeling which was conducted for the final permit and the critical dilution tables were recalculated. With these changes modeling conducted using CORMIX version 3.20 produces results which are more representative of the real world discharge scenario.

Comment No. 2:
The Offshore Operators Committee stated that reports cited in the Fact Sheet do not provide convincing technical support for the changes in the model from version 1.4 to version 3.20.

Response:
The discussion of dilution modeling included in the Fact Sheet for the proposed permit was intended simply to provide information as to how the permit's critical dilutions were calculated and was not intended to provide detailed technical explanation of all the mathematical theory and research upon which CORMIX is based. As discussed in the response to issue number one, EPA believes CORMIX version 3.20 to be the most appropriate tool to assess dilution at this time. Changes in successive versions of CORMIX are found in the peer reviewed research which has been conducted by the authors of CORMIX. References listed in the Fact Sheet for the proposed permit include many of the peer reviewed research papers upon which changes in CORMIX from version 2.10 to version 3.20 are based. Changes which were made to CORMIX between version 0.0 and version 2.10 and the supporting research were not referenced because version 2.10 is not a recent release of CORMIX and those changes were not deemed to be relevant to this permit issuance. Those changes are, however, discussed in text files which are included in the software for CORMIX version 3.20, and can be found in the directory entitled "Readme". Changes to the model are also discussed in the user's manual (Jirka et.al., 1996) and in the technical documentation for CORMIX3 (Jones et.al., 1996). Although the CORMIX3 documentation has not yet been published by EPA, it is available on the Internet at the following address: http://www.ese.ogi.edu/ese.docs/doneker/Cmxpg.html.

Comment No. 3:
The commenter has noted that limitations are more stringent for some discharge scenarios than in the previous permit and stated that this situation could be avoided by using CORMIX version 1.4. It is a better predictor of real world dispersion and would ensure continued conformance

with Ocean Discharge Criteria.

Response:
Anytime changes are made to a model or to the parameters used as model input changes in the results produced by the model should be exhibited. In this case, due in part to refinements made to the CORMIX model between version 1.4 and version 3.20, 75% of the proposed produced water toxicity limits were more stringent those contained in the expired permit. 23% of the proposed limits were less stringent than those contained in the expired permit. If the produced water critical dilution tables were not expanded, the limits would not have been recalculated and those changes would not have been made. However, in order to accommodate the Offshore Operators Committee's request to allow larger volume discharges, the permit's critical dilution tables were recalculated. CORMIX version 3.20 was used instead of an older version of the model because it is the Agency's best predictive tool. Use of CORMIX version 3.20 was also suggested by the industry's technical contact. Those changes in the modeling approach were also discussed with EPA's technical support contractor in order to ensure that they were technically valid (Wilson Oct. 22, 1997). Additionally, recent analysis of the CORMIX model by the Science Advisory Board states that CORMIX version 3.20 performs fairly well in predicting dilutions and plume dimensions. The Science Advisory Board's report states that improvements in the model have helped to resolve the severe overestimation of plume collapse which makes older versions of CORMIX less accurate (USEPA Science Advisory Board, Feb., 1999).

OOC's comments were discussed with Dr. Robert Doneker, EPA's national consultant for the CORMIX model and it was determined that several changes in input parameters would result in more representative critical dilutions calculated by CORMIX. A wind speed of 0 meters per second was used for model runs conducted for the proposed permit. Wind induced turbulence will have an effect on produced water dilution and a wind speed of 7.1 meters per second would be more appropriate. Due to the inverted method needed to run CORMIX for a negatively buoyant plume, density stratification would be best modeled as a two layer stable density profile (Doneker Oct. 6, 1998). In an inverted scenario, CORMIX does not calculate the plume to rise as far as it is expected to descend in the real world when the receiving water is modeled as having a linearly stratified density profile. By modeling the receiving water as a two layer stable density profile, the distance the plume rises can be adjusted so that the results more closely simulate the actual discharge (Wilson Dec. 21, 1998). Both of these changes were incorporated in modeling which was conducted for the final permit and the critical dilution tables were recalculated.

Modeling is the appropriate technique to address the prediction of dilution for the permits water quality based limits. EPA believes CORMIX version 3.20 is the best model currently available for the purposes of the Outer Continental Shelf general permit. Calibration and verification with reliable field data and analysis through a rigorous statistical framework are needed to assess the the results of mathematical models in order to have confidence in those results (Hammer and MacKichan 1981; Warwick and Wilson 1990). The Offshore Operators Committee has provided several field studies which have proven to be very helpful in that process in regard to this permit. Data available at this time, including those industry supplied studies, suggest that

CORMIX version 3.20 produces results which are reasonably representative of the available field data.

Comment No. 4:
CORMIX version 3.20 is not an accurate predictor of the dispersion that actually occurs in the Gulf of Mexico.

Response:
EPA disagrees. The Offshore Operators Committee based its assertion on two produced water field studies, a radium tracer study and a dye study. Upon examination of those studies it was found that neither study supports OOC's claim that CORMIX version 3.20 is an inaccurate predictor of the dilution of produced water in the Gulf of Mexico.

The discrepancies between the proposed permit's critical dilutions and the results of the studies are caused by different ambient conditions observed when the studies were conducted versus those used as model input. Since the permit covers a large area, input parameters were chosen which are representative of normal conditions throughout the area of coverage and throughout the year (Avanti 1992). The values chosen for input parameters by EPA were also used in the expired permit. OOC did not object to the selected values of input parameters during issuance of the expired permit nor in this reissuance process. Therefore, EPA has no reason to believe OOC thinks the values are inappropriate for the area covered by the permit. Both of the studies cited by OOC were, however, conducted at times when the receiving water density was much less stratified than is normally expected, and the ambient velocity was higher than normal (Brandsma and Smith 1996, Avanti 1992). Ambient velocity and density stratification both highly affect the amount of dilution produced water discharges receive (Smith et.al. 1994). In cases such as these, with a lower density stratification and higher ambient velocity, the effluent will be more diluted at the edge of the mixing zone due to the greater distance the plume will travel before becoming trapped. Thus, the differences between the results of the field studies and the proposed permit's critical dilutions are not caused by some sort of problem with CORMIX version 3.20 but by differences between the ambient data used as model input and the atypical ambient data observed in the field studies.

The Radium tracer study OOC cites (Smith 1993) attempted to characterize the effluent plume by using field measurements of Radium-226. There are several problems with that study which detract from its usefulness. The first problem lies in the absence of important data. Temperature and salinity for both produced water and the receiving water were not reported and wind speed was not reported. Without these data, model input parameters must be assumed and the reliability of the results is decreased. The second major problem with this study originates in the parameter which was monitored. Radium-226 is not a good parameter for this purpose. Due to dilution of the produced water plume, Radium-226 is diluted to such low concentrations that measurement is unreliable (Smith et.al. 1994). Another factor which magnifies the uncertainty of this study is that Radium-226 is naturally present in the receiving water at levels from 0.07 to 0.30 pCi/l (Neff 1997). Variations in the background levels of Radium-226 will increase the uncertainty of the study results.

Despite the high level of uncertainty inherent in Smith's study, CORMIX version 3.20 was run in an attempt to verify OOC's assertion that it is not an accurate predictor of dilution of produced water in the Gulf of Mexico. Model input values for produced water density and receiving water density were assumed based on average characteristics for the Gulf of Mexico. The input parameters for the current speed, density stratification, receiving water depth, discharge rate, discharge pipe diameter, and produced water radium concentration, obtained from OOC's study, were used as model input. The results produced using CORMIX version 3.20 largely agree with those observed in the study. CORMIX predicted a Radium 226 concentration of 1 pCi/L at 12 meters from the discharge point; whereas, the study found a concentration of 1 pCi/L at 10 meters from the discharge point. At 30 meters from the discharge point the measured value of Radium 226 was 0.3 pCi/L, while CORMIX calculated a concentration of 0.318. CORMIX calculated a concentration which is slightly less than the reported concentration at 50 meters from the discharge point (0.152 pCi/L versus 0.2 pCi/L). At the edge of the mixing zone (100 meters), the author of the study was unable to measure Radium 226 in the receiving water. The concentration of Radium 226 calculated at 100 meters using CORMIX version 3.20 was 0.127 pCi/L. Based on those comparisons of Radium 226 concentrations calculated using CORMIX version 3.20 with those reported by OOC, it appears that CORMIX does not over estimate effluent concentration but instead predicts Radium 226 concentrations which are very close to those observed by OOC.

Smith's study also attempted to compare results produced using the OOC Mud and produced Water model with those produced using CORMIX and CORMIX modified with the Brooks equation. Although the paper does not state which version of CORMIX was used, it most likely was CORMIX version 1.4 and definitely was not version 3.20. The OOC model was apparently properly calibrated using site specific data and appears to produce results which are somewhat representative of the study's field measurements of Radium-226. The paper is silent, however, on whether site specific values for input parameters were used for CORMIX. It states that the dilution of Radium-226 was calculated using: "the CORMIX1 procedure used for the 'critical dilution' table in the 1992 Final NPDES Permit for the Western Gulf of Mexico Outer Continental Shelf" and "the CORMIX1 procedure used for the 'critical dilution' tables in the proposed modification to the permit (Environmental Protection Agency, 1993a)." Comparisons between the paper's CORMIX calculated Radium-226 concentrations and the corresponding critical dilutions listed in either the 1992 permit or the 1993 modification suggest that the Radium-226 concentrations were calculated by the author using CORMIX. If Smith's results were produced using CORMIX version 1.4 with site specific data, the paper seems to show that CORMIX version 3.20 is a much better tool for calculating the dilution of produced water.

The second study cited by the Offshore Operators (Smith, et.al. 1994) was a fairly extensive dye study of a produced water discharge from an offshore platform located in the Gulf of Mexico. As with the Radium-226 dilution study described above, the ambient conditions reported in the dye study were not representative of average conditions for the permit's area of coverage. The receiving water density was reported to be much less stratified than is normally expected and the ambient velocity was higher than normal. Both of these greatly effect the amount of dilution the produced water discharges will receive and largely explain the differences between the proposed permit's critical dilution and the dilution of produced water which was observed in the dye study.

Again, with this study, the authors failed to report the wind speed. The authors state that wave heights during the study ranged from one to two meters and that "video recordings demonstrated that the wave action induced orbital motion of the discharge pipe and the effluent plume" (Smith et.al. 1994). In this case, the wind had an observed effect on the produced water plume and it's velocity is important model input which is not available.

In an attempt to understand OOC's comments that CORMIX version 3.20 does not accurately predict produced water dispersion in the Gulf of Mexico, the model was run using input data obtained from the dye study. In the absence of data, a moderate wind speed of 8 meters per second was input. The resultant produced water dilution calculated using CORMIX version 3.20 was 0.215% at 103 meters from the discharge pipe. Although the difference in dilution will be negligible, 103 meters was used instead of 100 meters, to correspond to sampling locations reported for the dye study. When CORMIX version 3.20 was run using a higher wind speed of 10.28 meters per second (25 nautical miles per hour) the produced water dilution was calculated to be 0.146%. Although there is no way to estimate the true wind speed, both wind speeds are deemed to be reasonable for the sea conditions observed during the dye study. Both produced water dilutions calculated using CORMIX version 3.20 are within the 95th percentile confidence limits of the mean (0.37%) reported by the authors of the study.

Based on the results presented in both of these papers (Smith 1993 and Smith et.al. 1994) it appears that OOC's comment is invalid. EPA ran CORMIX version 3.20 using the parameters reflecting the wind speed, density stratification, and current speed for the field studies. The model was found to predict dilutions consistent with the actual field measurements reported in those studies.

Comment No. 5:
Changes in CORMIX version 3.20 result in significant increases in predicted effluent concentrations at the edge of the mixing zone.

Response:
Analysis of the proposed permit's produced water critical dilution tables shows that in 75% of the cases the proposed limits are more stringent, in 22 % of the cases they are less stringent, and in 3% of the cases the limits are unchanged from the expired permit. Those changes are not, however, significant. For most discharges authorized by the permit the critical dilution will change from something in the range of 0.13% to approximately 0.25%. A large percentage of discharges located in shallow water would actually have less stringent limits under the proposed permit than under the expired permit. Those are generally cases with higher critical dilutions which should be of greater concern for the industry.

Relative to toxicity limits which EPA Region 6 has implemented for other industrial dischargers, these are very low limits. It is not unusual for a petroleum refinery or organic chemical manufacturer to have to meet much more stringent limits of 20% to 30% for a critical dilution. Although produced water discharges are generally much more toxic than those of other

industries, effluent data reported on discharge monitoring reports, data presented with OOC's comments, and produced water data presented in literature (Brandsma and Smith 1996, Avanti 1992) suggest that produced water discharges will be able to meet the relatively lenient limits in the final permit. In the extreme cases where discharges are more toxic than allowed by the permit, it affords several relatively inexpensive means to obtain additional dilution and become compliant with the toxicity limits.

It should be noted that some of the changes in model results are not actually as large as OOC's comments make them appear. For instance, OOC shows that one critical dilution in the proposed permit is 5.08 times more stringent than the corresponding dilution in the expired permit. The case cited by OOC is for a 25,000 barrel per day discharge with a 4 meter distance between the discharge pipe and the bottom. The problem with this comparison is that the two dilutions were calculated for different diameter pipes. The dilution listed in the expired permit is for pipe diameters from 0 to 3 inches and it was calculated using a 2 inch diameter pipe for model input. Unusual model results were noted for large discharges made through a 2 inch pipe, when the critical dilutions were calculated for the proposed permit. CORMIX also produced a message in some of those cases which stated that its predictions were unreliable. This problem was discussed with industry representatives and it was agreed that dilutions calculated for a 2 inch diameter pipe would not be included in the permit (Smith May 23, 1997). Although a 2 inch diameter discharge pipe is used in some instances, it is somewhat unusual. It is also highly unlikely that discharges of that high a rate are made through a 2 inch diameter pipe. It is however likely that, regardless of which version of CORMIX is used to calculate the critical dilution, a 25,000 barrel per day discharge in 4 meters of water will violate the toxicity limit.

Comment No. 6:
OOC commented that CORMIX version 3.20 allows no dilution by entrainment during the calculations for the "layer formation" flow category.

Response:
EPA agrees that CORMIX version 3.20 does not allow dilution by entrainment during the calculations for the "layer formation" flow category. CORMIX version 1.4 also did not allow dilution by entrainment during the calculations for the layer formation. The boundary interactions occurring during layer formation are very complex and not amenable to mathematical modeling. The authors of CORMIX circumvented that problem by using a control volume to estimate dilution by entrainment during layer formation (Akar and Jirka 1991). To EPA's knowledge, no model exists which calculates dilution by entrainment during the process of layer formation (Wilson Dec. 21, 1998).

Comment No. 7:
The Offshore Operators Committee commented that comparison of model predictions with experimental data shows that CORMIX version 3.20 underestimates dilution and spreading for the laboratory equivalent of a shallow water discharge.

Response:
The Cavola and Davis (1983) paper which OOC cites as proof that CORMIX underestimates dilution and spreading in the laboratory equivalent of a shallow water discharge was, to EPA's knowledge, never published in a refereed journal. The accuracy of the study presented in that paper is unknown since it has not undergone the peer review process inherent to publication in a refereed journal. CORMIX, however, was developed using independent data from papers which have undergone peer review. The most relevant of those papers in regard to this comment are papers by Roberts and Poms (1987) and Tong and Stolzenbach (1979) (See also Doneker and Jirka, 1990). Those data were used in the validation process for CORMIX version 3.20 and are closely matched by the model's results.

Comment No. 8:
The Offshore Operators Committee stated that comparison of model predictions with field observations shows CORMIX version 1.4 with the Brooks equation modifier produces more representative results than CORMIX version 3.20.

Response:
As shown above, CORMIX version 3.20 predicts produced water critical dilutions which are reasonably consistent with field data collected by OOC. Use of the Brooks equation modifier is questionable from a hydrodynamic viewpoint because it ignores the density current behavior of the plume (Doneker July 4, 1998). Due to the density difference between produced water and the receiving waters, the plume in the far field will behave as a density current. A density current is likely to resist transition to passive dilution in the far field. There is also limited entrainment along the density current edges which will have the effect of decreasing the dilution.

Comment No. 9:
The Offshore Operators Committee commented that critical dilution tables calculated using CORMIX version 3.20 contain anomalous predictions of decreasing dilution with increasing water depth.

Response:
Upon examination of the inconsistencies noted by OOC it was found that there were many more such apparent incongruities in the critical dilution tables of the expired permit than in the proposed permit. In that sense, it appears CORMIX version 3.20 does a better job of classifying a particular discharge and using the most appropriate module to perform the necessary calculations than did CORMIX version 1.4. Due to the changes in modeling technique for the final permit, none of the inconsistencies noted by OOC exist in the produced water critical dilution tables.

Comment No. 10:
The Offshore Operators Committee commented that the inversion necessary to use CORMIX

version 3.20 to model offshore produced water discharges appears to result in significantly lower dilutions than for a non-inverted case.

Response:
As stated above, produced water critical dilution can be modeled with reasonable certainty using CORMIX version 3.20. A negatively buoyant plume, such as produced water, is best modeled by CORMIX as an inverted case (Wilson Dec. 21, 1998). The inverted method was used with CORMIX version 1.4 to develop the critical dilution tables for the expired permit (58 FR 63964) just as it was with CORMIX version 3.20 for the proposed permit. That same method of inversion has also been used by other EPA Regions (63 FR 55717), the Department of Energy (Meinhold et.al. 1996), and by State agencies in Louisiana and Texas for modeling the critical dilution of produced water.

Comment No. 11:
The Offshore Operators Committee stated that it was not able to reproduce model results for the seawater and freshwater discharges. It claims they should be recalculated using CORMIX version 1.4.

Response:
OOC did not offer a technical explanation as to why it believes CORMIX version 3.20 does not adequately simulate the freshwater and seawater discharges; therefore, the critical dilutions for the final permit were not recalculated using CORMIX version 1.4. The comment also does not explain why OOC believes that CORMIX version 1.4 better predicts the dilution of freshwater and seawater discharges than does CORMIX version 3.20.

OOC was supplied with all of the information used as model input at the time the proposed permit's limits were developed. It is evident in correspondence from an OOC representative to EPA (Smith, Feb. 6, 1998) that OOC understood what values were used for input parameters and how CORMIX version 3.20 was run to calculate the toxicity limits for chemically treated freshwater and seawater discharges. It is not clear why OOC was not able to reproduce the model's results. The Fact Sheet for the proposed permit stated that the freshwater discharges were modeled as surface discharges. It did, however, incorrectly state that seawater discharges were modeled in the same manner as produced water discharges. EPA believes, however, that this inadvertent misstatement did not effect commenter's understanding of the model. In fact, Smith's correspondence suggests that the error in the Fact Sheet did not cause any confusion on OOC's part and that it was well understood that chemically treated seawater discharges were modeled as surface discharges by EPA.

However, to ensure the accuracy of the permit's critical dilutions for seawater and freshwater discharges, the dilutions were recalculated. Based on the extensive investigation of CORMIX version 3.20, which the Agency has conducted to resolve issues raised by OOC, the input parameter for wind speed was changed for the final permit. The proposed permit's critical dilutions for chemically treated seawater and freshwater discharges were modeled with a wind

speed of zero meters per second. Since that is not representative of the wind which is normally expected in the Gulf of Mexico, the critical dilutions were recalculated for the final permit with a wind speed of 7.1 meters per second (13.8 nautical miles per hour).

Comment No. 12:
OOC commented that EPA did not analyze the financial and other impacts of the more stringent produced water toxicity limits.

Response:
The produced water toxicity limits are water quality based limits which ensure that produced water discharges authorized by the permit will be compliant with Ocean Discharge Criteria as required by section 403(c) of the Clean Water Act. Unlike technology based limitations which must meet economic achievability tests, there is no requirement for financial analysis of water quality based limits. However, based on information provided by the industry, there appears to be little likelihood of any significant economic impact. The number of facilities which will have problems complying with the new limits is expected to be very small. In the few cases where an operator needs to make adjustments to become compliant with the more stringent limits, the permit affords several relatively inexpensive remedies operators can take to become compliant with the limits.

Comment No. 13:
OOC requested clarification of the permit's language defining produced water discharge flow rates used to determine the critical dilution and monitoring frequency for toxicity testing. It requested a delay of the testing requirement for three months for new discharges so that a representative flow may be established. OOC also requested a delay in the testing requirement for existing discharges under the new permit to the beginning of the first calender quarter after the effective date of the permit.

Response:
The requested change has been made to the permit for new discharges. NPDES permits issued by EPA Region 6 often allow a period of time for permittees to come into compliance with new water quality based requirements. This allowance is also consistent with the one given by the permit when produced water toxicity testing was first initiated. At that time all permittees were given a period of one year before monitoring was required.

The effective date of monitoring for existing dischargers was, however, not delayed in the permit. OOC did not present a rationale for requesting a delay in monitoring and EPA believes one is not needed because most discharges are monitored only once per year. Therefore, no confusion should exist concerning the overlap in monitoring between the expired and the reissued permit.

Comment No. 14:

The Offshore Operators Committee commented that the requirement to monitor oil and grease in the produced water discharge when a sheen is observed should be changed to a requirement to investigate the cause in the produced water treatment system and take appropriate actions. It stated that collecting a sample when a sheen is present will result in unrepresentative sampling and unnecessary violations of the permit. OOC also stated that sheens can be caused by solids precipitation and iron oxide in the treatment system.

Response:
EPA disagrees with the allegation that the requirement to monitor produced water for compliance with the oil and grease limits will result in unrepresentative sampling or unnecessary violations of the permit. The oil and grease limits are violated more often than any other limits in the permit. Based on information received from Coast Guard and Minerals Management Service inspectors, it appears that when a sheen resulting from the produced water discharge is observed, the treatment system is not working properly and the discharge is likely to be in violation of the oil and grease limits. The goal of the proposed monitoring requirement is that operators will better maintain their treatment systems so that they will more consistently be in compliance with the permit limits. Altering the monitoring requirement as requested would not prevent treatment system problems which cause discharges to be non-compliant. EPA believes that a monitoring requirement will cause the industry to take a more proactive approach to maintaining produced water treatment systems, which will reduce the discharge of pollutants to waters of the United States. The approach suggested by OOC would not result in any substantial increase in permit compliance because it would not cause operators to fix problems with treatment systems until after they occur and the discharge violates the permit's limits.

EPA also has not seen data which support OOC's comment that solids precipitation or iron oxide in produced water would result in a visible sheen which would required unnecessary sampling by permittees.

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Final NPDES General Permit for the Western Gulf of Mexico Outer Continental Shelf (GMG290000), 57 FR 54642, USEPA, November 19, 1992.

Final Modification of the NPDES General Permit for the Western Gulf of Mexico Outer Continental Shelf (GMG290000), 58 FR 63964, USEPA, December 3, 1993.

Final National Pollutant Discharge Elimination System (NPDES) General Permits for the Eastern Portion of Outer Continental Shelf (OCS) of the Gulf of Mexico (GMG280000), 63 FR 58717, USEPA, October 16, 1998.

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